

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

FEB. 11, 1952

50 CENTS

"We're ready to pour. Say 'when'!"

That might well be what the boom operator of this Boeing KC-97 flying tanker is saying, via radio, to the pilot of the Boeing B-47 Stratojet.

Because he knows the crew of the six-jet bomber wants to take aboard *just the right amount* of fuel to fit in with proper flight planning. No more—because it would mean useless weight. And certainly no less.

Helping to make sure they do get just the right amount are Honeywell *electronic* fuel gauges—the same kind of *really dependable* fuel gauges that are found in so many major types of aircraft today. Because of Honeywell's high engineering, research and material standards, Honeywell electronic fuel gauges have the highest degree of accuracy.

This is only one of many Honeywell products now in use by the aviation industry. We expect the list to grow longer in future years. Because automatic controls are so important to aviation progress. And Honeywell has been the leader in controls for more than 60 years.

Aeronautical Division
Minneapolis-Honeywell • Minneapolis 13, Minn.

MINNEAPOLIS
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Aeronautical Controls



Hydro-Aire

In the Air Force, too...
every fighter, every bomber,
every transport, is
Hydro-Aire equipped.
Hydro-Aire Inc.,
Burbank, California.

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B.F. Goodrich



Molded lips that seal tight come open with a zip

Seal that saves muscle zips off to save time (1) In the Boeing B-47, and were needed between elevator and stabilizer, cockpit and stabilizer, and between wing and main control cases. But with ordinary seals, hundreds of screws would have to be removed every time a control surface had to be taken off. B. F. Goodrich's zip, Pressure Sealing Zippers for the flaps. These molded rubber lips successfully prevented air flow through the large area. And mechanics unzip the flaps in seconds.

It lets men in—keeps fumes out (2) Keeping engine fumes out of a jet's

cockpit called for a partition between cockpit and fuselage. But with a standard metal partition, mechanics would have to fuss with holes in screens to get in for maintenance. BFG engineers' answer—a flame canvas sealed with a Pressure Sealing Zipper. The zipper's molded rubber lips provide a 100% effective seal. The canvas can be opened in seconds.

Shuts up torrent of hot air (3) The system wanted to make the hot air duct in the Douglas C-124 in 6 face sections.

They needed a strong, flexible coupling that would permit easy removal of the sections. B. F. Goodrich's Pressure

Sealing Zippers proved ideal. Their molded lips provide a 100% seal. They resist heat and damage, speed maintenance.

Pressure Sealing Zippers fit everything flaps can be connected. Save space and weight. Only B. F. Goodrich produces for aviation include zinc, wheels and bushes, bonded rubber, De Icers, Avitacs, inflatable seals, fuel seals, fluid seals, inflators, Rivnuts, screws, nuts. The B. F. Goodrich Company, Akron, Ohio.

B.F. Goodrich
FIRST IN RUBBER

SPS

aircraft fasteners



STANDARD "SIX-SIDED" ENGINE BOLTS
All listed dimensions—check and internal wrenching types are AN specifications.

NAS SHEAR BOLTS
Close tolerances, high strength, flat head type.

NAS INTERNAL WRENCHING LOCK NUTS
Superior safety nuts. Specifications 15 to 150.

NAS INTERNAL WRENCHING AIRCRAFT BOLTS
Latest NAS specifications. Therefore fully formed by rolling after heat treatment.

INFORMATION UPON REQUEST ADDRESS DEPARTMENT 478

FLEXLOC



FLEXLOC SELF-LOCKING NUTS, REGULAR TYPE

Both shop and field use. One piece construction, no adjustment back positively with uniform torque. Aircraft approved, sizes 4 to 15/16 inches. Regular and Plastic approved for temperatures to 330°F.



FLEXLOC SELF-LOCKING NUTS, THIN TYPE

Like thin regular height, yet conforms to accepted standards. Berry thread, including the locking threads, carries its share of load. Shows all required Plastic features, but save weight and bulk. Aircraft approved, 4 to 15/16.



FLEXLOC EXTERNAL WRENCHING NUTS

Two-piece. Features Plastic self-locking principle and one-piece, all-metal construction. Listed NAS specifications. Sizes from 3/16 to 1 1/2. NSF Shock Series. Approved for temperatures to 330°F.

INFORMATION UPON REQUEST ADDRESS DEPARTMENT 31

AIRCRAFT PRODUCTS DIVISION

STANDARD PRESTED STEEL CO., JENKINTOWN 3, PENNSYLVANIA



NEWS DIGEST

DOMESTIC

May Gen. Louis W. Johnson, commander of the 16 Air Force in England, has been reassigned to duty over the Continental Air Command at Mitchel Field, L. I., N. Y., replacing hospitalized May Gen. Willis H. Hale.

Aero Commander light transport, built by Aero Design & Engineering Co., Oklahoma has received its approved type certificate by CAA. Output of at least 100 is scheduled for this year.

Edward E. Statten, Jr., CAA public relations officer was re-elected president of the Aero Club of Washington. Other officers: Edmund L. Becker, first vice president; Alexander McLaughlin, Anthony Wynn, second vice president; Miss Paul T. Robinson, third vice president; George B. Gills, Douglas Aircraft Co.'s Washington representative; and Kenneth H. Griffin, Washington National Airport manager, secretary.

Spencer Crane, 36, who worked with the Wright brothers on their first airplane, died at his home in Syracuse, N. Y., Jan. 23.

William E. Volk has been re-elected president of the Manufacturers Aircraft Assn., which administers the patent cross-licensing agreement for the U. S. aircraft industry.

Civil aircraft exports (planes of 6,000 lb or less) during 1971 totaled 431 valued at \$5,163,548, compared with 417 units exported during 1970 valued at \$2,252,783.

Paul M. Goddard, Chicago attorney and United Air Lines director for 18 years, died Jan. 12.

Harry K. Coffey, West Coast aircraft executive and aviation executive, has been elected president of the National Aeronautic Assn., succeeding Joseph T. Coffey, Jr.

More than 350 turbine engine auctions have been ordered from Speers-Corcoran Co. by USAF, mainly for its activities in Canada. It has 100 bombers and Douglas C-124 Globemasters. 2 transports. The order covers Speers' total for the auctions over 7,000.

Lamont A. Raine, Electronic computer official operational at Dayton, Ohio, for procurement irregularities

Associated Press Feb. 4, p. 71, was denied a review of his case by U. S. Court of Appeals, and was ordered remanded into custody of a U. S. marshal. The attorneys plan to appeal to the Supreme Court.

FINANCIAL

United Air Lines has sold \$50 million in debentures to help finance new equipment purchases. The debentures are for a 15-year term and carry a 5 1/2 percent rate.

Hawman Airlines Ltd. reports that profits in 1971 were no better than 1961, despite a few big gains in volume. Carver made \$12,599 on 34,945 passengers in 1961, but now shows a loss for 1971 despite carrying 143,543 passengers. Increased taxes are blamed.

Aeromexico Corp., Mexico, made reports net sales of \$1,787,762 in first fiscal quarter ended Dec. 31, 1971. Net profit after taxes was \$271,684.

Consolidated Vactor Aircraft Corp., San Diego, reports net profit after taxes of \$77,044 for the fiscal year ended last Nov. 30. Net sales for the period were about \$322 million. As of Nov. 30, Vactor's backlog was about 5000 airplanes.

Waco Aircraft Co., Troy, Ohio, reports net sales of \$967,953 for the year ended last Sept. 30 with net profit being \$128,562.

Trans World Airlines' board has authorized an offer to stockholders to subscribe to one share of common for each ten shares held, at a offering price of \$21.25 per share. Stockholders must be at least 40 at Feb. 27, or each later date as the registration statement becomes effective.

Boeing Airlines has declared a 10% cash dividend payable Feb. 15 to holders of record on Feb. 5. A 30% cash dividend was declared by the carrier Dec. 15.

INTERNATIONAL

Canada will spend \$1.5 billion to build more than 2,000 new military planes, mostly CF-180 Canards and F-86 Sabre fighters, states Defense Minister Brooke Claxton. Claxton says that Aero Canada Orderly get engine and CF-180 production are behind schedule, but are coming along and Canada expects to outfit a jet squadron every two months from now on.

TYPICAL PROBLEMS

Coming TMI May:

"The development of STAINLESS STEEL ENGINE SPACERS... must be high strength, corrosion resistant and be effective proof of fastening."

"Can you make a STAINLESS tubing to operate at 1500 in our highly corrosive solution? It will double our production rate!"

"The nature of these Gages... requires tubing that is machinable, non-magnetic, and polished inside. As of course, has a special electrochemical treatment."

"In the design of this aircraft, low weight, the Stainless tubing should have a new coefficient of expansion. What do you suggest to accomplish...?"

Producers of
**QUALITY Small Diameter
Stainless Steel
Tubing Since 1941**

IT'S A GENERAL PRINCIPLE
TO COME UP WITH THE
RIGHT ANSWERS AT THE
TUBE • 21 Course 1



TUBE METHODS INC.
WILMINGTON • FINGERS • BARNESVILLE
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Although these models weigh only 3½ pounds, they have an ultimate static load capacity of 1,400 pound-inches and operate loads over 300 pound-inches through 360° rotation. Zero backlash, magnetic brake, ad-

Models R-370 and R-474 are identical in performance, but differ in mounting arrangements.

The newer, lighter TricTrak—H-420 and H-477—weigh 214 pounds and have an ultimate capacity of 1,500 pound-inches.

100 HARBOR CALIFORNIA • DALLAS, TEXAS • TORONTO, CANADA



IN THE NEWS TURBOPROPS

The Turboprop, most powerful propeller-type aircraft powerplant in the country, delivers more than 8000 horsepower in addition to an unducted amount of thrust. It's the first turboprop in the country and the first turboprop in the world. It's the first turboprop in the world. It's the first turboprop in the world.

Two years ago, in July 1911, G-E engines started work on a new type aircraft powerplant—an axial flow gas turbine driving a propeller. This was the TG-100, the first turboprop in the country and the first turboprop in the world.

General Electric engines today are experimenting with the Turboprop, a Northern development. Although larger than reported for today's transport needs, the Turboprop promises a new vehicle for testing new ideas and methods.

Two new turboprop engines are in the works at General Electric. Light weight and high power, these engines will someday be taking new aircraft to new heights and new speeds.

When you're considering powerplants, call in the company that pioneered the current gas turbine industry. Turboprop is our General Electric engine specialist, at 3000 General Electric Company, Schenectady, N. Y.



General XP-81, first turboprop-powered aircraft to fly in U.S., powered by TG-100, first American turboprop.



Design engineers Alex Howard and C. J. Walker, inspect an early TG-100 turboprop on test stand at Schenectady.

AIRCRAFT GAS TURBINES

GENERAL  ELECTRIC

WHO'S WHERE

In the Front Office

Col. Ray T. Thomas has been appointed as the new president of the American Helicopter Association. He was formerly executive vice president of a past vice president of the American Helicopter Association.

Charles J. Rogers is stepping in as the new president of the American Helicopter Association. He was formerly executive vice president of the American Helicopter Association.

Dr. John E. Eshelby has been named president of the American Helicopter Association. He was formerly executive vice president of the American Helicopter Association.

Changes

George C. Taylor has been appointed as the new president of the American Helicopter Association. He was formerly executive vice president of the American Helicopter Association.

Dr. W. C. Calkins has been appointed as the new president of the American Helicopter Association. He was formerly executive vice president of the American Helicopter Association.

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Honors and Elections

Dr. S. B. Bickel has been elected as the new president of the American Helicopter Association. He was formerly executive vice president of the American Helicopter Association.

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INDUSTRY OBSERVER

► Licensing agreement under which the Hughes Sikorsky S-55 helicopter (helicopters H-19) will be built in France by SNCASE has been completed. Negotiations for a Sikorsky license have been underway since 1947. The French manufacturer is now producing the four-engine Anjouan transport, about the size of the Sikorsky, and, under license, the de Havilland Vampire jet fighter. SNCASE is the second European license manufacturer for Sikorsky. Westland Aircraft Ltd. in Britain already is in production on S-55s.

► One solution for C-46 power problems, being investigated by a U. S. operator of the Commando transport, is the aerobically installation of a small gas turbine under the fuselage to give added power for takeoff and climb. It is under consideration but has been given a low priority. It is not in France, but engineering details of the installation are not yet available.

► Protection screens for the U. S. production of the Vickers jet engine (jet engine) has been needed to virtual vanishing point following loss of the prototype as a result of an engine fire in a test cell in Britain. The engine (jet engine) has been given a low priority. It is not in France, but engineering details of the installation are not yet available.

► Latest de Havilland report indicates a total of 18 firm orders for the Comet. The engine (jet engine) has been given a low priority. It is not in France, but engineering details of the installation are not yet available.

► Engineering complexity of the Boeing B-47B production line has been estimated to increase in accelerated flight tests of the new jet engine. The engine (jet engine) has been given a low priority. It is not in France, but engineering details of the installation are not yet available.

► General Electric is developing the electronic brain for the aircraft of the new aircraft B-47. The aircraft (jet engine) has been given a low priority. It is not in France, but engineering details of the installation are not yet available.

► USAF looking about the multiple refueling system developed by British Flight Refueling, Ltd., has changed its mind. The aircraft (jet engine) has been given a low priority. It is not in France, but engineering details of the installation are not yet available.

► The Westinghouse E-5 engine (jet engine) which is to go on the Lockheed F-94C may get a crack at replacing the Convair engine. The aircraft (jet engine) has been given a low priority. It is not in France, but engineering details of the installation are not yet available.

► Marine air officials are making quiet inquiry to USAF for detailed engineering studies of the C-47A-25 engine to go on production at the large Kaiser-Wilbur Ross plant. Although general USAF outlook has been in the light of the C-47A-25 engine to go on production at the large Kaiser-Wilbur Ross plant. Although general USAF outlook has been in the light of the C-47A-25 engine to go on production at the large Kaiser-Wilbur Ross plant.

Air Industry vs. Election

Aircraft manufacturing industry seems to be a lot of things going to be successfully based on the powerful political forces in the Presidential election year.

Those forces are: Labor and small business—where industry now appears generally to coincide with the biggest of big business, the well-integrated automotive industry, and other civilian industries, adding force to this drive for—

A further shriveling of the aircraft program, which accounts for over half of defense procurement. On the "Conservative" House Rep. Charles E. Wilson's comment: "We don't want to threaten death by producing a big war machine and then a war on the world." American Federation of Labor's Executive Committee objected that the Air Force is "trying to reach the voters" in its procurement program, called for establishment of a civilian board on military requirements to hold them down—later to be represented in the board.

Civilian Economy

Key factor here is:

• Aircraft industry has been on a build-up. When the build-up moves ahead, if money is green, that money (or might) have been laid out to be, and that small businesses that had obtained subcontracts may have those cancelled.

But, the blow to labor and small business lies here: industry when naturally allocations to the civilian economy are cut off. Now are laid off wholesale and small firms' operations are curtailed until, and if, they can readjust within the defense program. The Administration's proposed withdrawal from the defense industry, for example, reverberated throughout the economy down to subunits. And, as, is largely being pulled off for now.

On the zone of getting critical materials for civilian use, labor and small business seem to be getting their own. Last week Defense Production Administration's Monthly Production Conference had between 20 to 40 million lb. of aluminum would be shipped off USAF's inventory, second quarter allocations. A substantial part of it is to be allocated into the automotive industry. Margaret's Sec. John Moody anticipated the world's crude production of this "leading indicator of war."

More Contracts Later

Congress of Industrial Organization's spokesman, Walter Reuther, put it:

"The government contracts into civilian production is only a secondary consideration. The primary concern is to get defense contracts into our civilian automotive plants to replace civilian production."

Reuther's powerful CIO-IAW wants to cut down on plant expansion for aircraft production. On the labor's part, it means up the automotive industry, willing to expand capacity throughout the country. The nation wants aircraft produced in auto plants, as auto production is tapered off, to secure employment.

But the auto line part company with the auto line. That's really to set up separate facilities for production. J. E. Gilmore, chairman of Defense Mobilization Charles Wilson's "lost home," last week forecast:

Between now and June he can, no more than the previous

year of channeling \$400 million in defense contracts into the automotive industry.

But after the enactment of the 1955 fiscal year budget, his anticipated contracts would flow into auto lines.

Political Football

The more of more or less air power is going to be handled about in this session of Congress—starting now.

The Administration is going to stress the record regarding its role in the case of civilian industries from now to November.

There may be much talking in the opposite direction in Administration spokesmen, though.

Here's how Congressional debating on air power, much of it involving foreign ties, is likely to go:

• House and Senate Appropriations Committees—They too will be out to use the President's \$17-billion recommendation for USAF and Naval aviation.

Chairman George Malone of the House Subcommittee has sent out letters to his some 450 colleagues urging them to submit recommendations on ways and means to do it.

Sen. Joseph McCarthy focused the theme for his subcommittee's approach: "Preserving a sound economy is our strongest defense against Russia. Spending too big a budget for military defense is our best way to make money to deflation."

These are the two key committees on air power build-up. They decide on how much cash.

• Senate Preparedness Committee, headed by Sen. Lyndon Johnson, will vote another blast in the next forum against the slow-up of the air power program.

But that is all this Congress can do. Just.

• The big debate on air power, though, likely will emerge from Senate Armed Services Committee.

It'll be a 1952 second version of last year's "great debate" on air power in dispatch of troops to Europe to hold that lead over.

Republicans will split it. If the issue is questioned by Sen. Richard Russell, chairman of the Senate Armed Services Committee, it'll break out in Senate floor session.

USAF's Chief of Staff Gen. Hoyt Vandenberg's state report will be ammunition for the topic.

Republicans will quote: Who is it after the billions and billions of dollars laid out for defense, then member of the Joint Chiefs of Staff reports that the U. S. is lagging behind Russia on air power?

The House Majority leader on power Republicans are promoting the probe.

Meanwhile, though, the U. S. is moving in the opposite direction, now lead to build. Senate is going to confirm treaties which will obligate the U. S. to "build" against land invasion, not only the continent of Europe, but the Greece and Turkey.

• State Dept.'s Position—State Department is the spark behind current publicity on the increasing role of Russia in air power over U. S. air power.

State Dept. doesn't like Defense Mobilization Director Wilson's outlook in the aircraft program to channel material into auto and other civilian production.

Top State Dept. officials are telling the President that if he wants U. S. deployment, let's be a strong ally, he's got to step outside the home front industries and put some jet power behind aircraft production.

—Nathaniel Johnson

Slash in Funds Threatens U. S. Air Power

Parade is drawn between political implications of current election year cuts and those of 4 years ago.

Nation's air build-up, which took a severe beating in "muzzle-trimming" days, again suffers most heavily.

Peak AF aircraft programs scaled down an average of 30%, engines even more; Navy takes 15-20% out.

By Alexander McEachy

The severe slashing of U. S. military aircraft programs resulting from the reduced 1955 military budget is being described by some informed Washington observers as a point where the airway turned out 65,000 aircraft engines in World War II has been pared to only 20 engines a month for its best period.

Chairman appears good that the plant will be closed completely and laid in steadily constant.

Reports are that the whole Wright B-350 program has been cut back to 45% of its planned peak level.

• Ford Aircraft Engine division's new 550 million planning contract to make Pratt & Whitney J-37 jet engines at Chicago's Executive Wings Inc. (E. A. 15) is specifically programmed to operate at the rate of operating the great Chicago plant, on the jet engine, due to the fact that the Pratt & Whitney B-350 engine, in which the plant is now working, is best shown out of production at a new aircraft plant.

It was feared that the licensing agreement between Pratt and Pratt & Whitney for the J-37 was still under negotiation but the work has now been completed.

• Informed observers estimated that, possibly, the scaling-down of peak production programs for the Air Force is enough to slash by more than 30% and for engines even higher. Navy's aircraft plant levels was cut, he says, 15 to 20%.

• 1948 Finkel—Washington observers drew a parallel between political implications of the slashes in the forthcoming defense budget is a parallel between the one and the political angles which surrounded the Louisiana oilfields outside in air power in 1948, another election year.

The Johnson efforts have been blamed to Congress for the weakened U. S. national defense which in some observers' opinion led to the Korean war. The new emphasis in the present administration situation is being justified by a similar effect.

New details of how the cuts affect other phase and engine programs.

• Glenn L. Mott Co. (Cleveland) B-7A field of bomber program, which was scheduled to build a peak and level

• Verbal Comments—One explanation for the cuts in 1955 schedules goes back to the early days of the Korean crisis in mid 1950 and the first lead-up to the following.

Military services and particularly USAF, eager to get enlarged programs rolling and conscious of the long lead times on many items, issued letters of intent and various forms of contract needs to manufacturers without the full cost information to back them up.

Instead they had verbal good-byes from Congress that some funds could be forthcoming.

A high Air Force official told Aviation Week Inc. in 1951 that many USAF procurement commitments were stretched on a down payment basis.

Lead of some subunit contracts were in arrears as 1952 defense program was provided for, others were in smaller amounts, but complete programs were being made on some small contracts for government-financed property (contract etc.).

• Political Necessity—But the verbal good-byes on the program of 1950 did not solve with the political necessity for reducing the bid on the budget is a general election year. Now in additional programs because they have to be taken out of available 1953 funds, or programs have to be cut so that funds will meet commitments.

Another factor cited officials as an explanation for the scaling-down of cut back is the increasing reliability of U. S. jet engines as demonstrated by both combat and non-combat experience.

With increased progress increasing on the standard U. S. jet engines, such as the GE J-47 and the Allison J-35 and J-37, the number of spare engines and spare components required per airplane is considerably less.

When this is taken into account, the reliability of the engine is entirely responsible for the cut in spare or whether the closest of calculated risk, which has governed the entire engine program, as the criterion in spare parts spending.

• Transport Cut—Cutbacks in the civilian engine programs are attributed largely to the heavy cuts that the military transport (Aviation Week Jan. 21, p. 11) and the new program (p. 11) is favored.

Reduction of approximately 40% has been made in the Douglas C-124A four-part scheduled peak production. This over the huge new Air Force cargo for

AF Chief to Quit?

Reports are that Air Force Chief of Staff Gen. Hoyt Vandenberg will resign before his present time of duty expires (13-08 news, Apr. 30, 1952).

Source close to his court has health is better and, significantly, that it is a common for a military chief of staff to be notified by the President on monthly or quarterly basis that he has been notified.

He has been notified on the basis of his health and, significantly, that it is a common for a military chief of staff to be notified by the President on monthly or quarterly basis that he has been notified.

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BRISTOL 175'S FIRST HOP—New helicopter Bristol 175 four-passenger helicopter (above) is seen during its first flight test recently. Powered by two 190-hp. Allen Leonard L.E. 25 engines, the 175 has a normal gross weight of 10,600 lb., 142 mph. top speed.

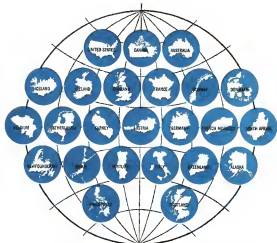


Copter Developments

BRISTOL 171—Rear view. (Left) of Bristol four-passenger helicopter points up high capacity of transport over aerial cable. Forward blades behind cockpit are detachable, entire structure. Symmetrical can run up to four including two main/tilt.



PIASECKI HO4S WORK HORSE—Rear view indicates how new Piasecki HO4S could support ground forces by being heavy artillery over snow and mountain terrain blocking aerial ground vehicles. For HO4S is moving completion, it compares to Martin F-4, plus



Gilfillan Radar *First Standard Equipment Among Free World's Allies*

GILFILLAN GCA—the original radar for landing aircraft in bad weather—is the first equipment to be adopted by 24 allies of the free world.

Developed by Gilfillan for the USAF in World War II, the latest GCA landing system is now being

produced to provide safe, all-weather landings

for the CAA, USAF, U.S. Navy, U.S. Marine

and 24 countries around the globe.

Gilfillan
LOS ANGELES



Another Thompson "First" . . .

VALVES

with the
**TOUGHEST BODIES,
HARDEST FACES**
in the air

"Hundreds more service-hours" . . . "longer time between valve replacement" . . . "no signs of bearing" . . .

Airline operators report these benefits from the new Thompson T.P.M. Valves on their Pratt & Whitney Aircraft R-4060 Engines.

A new harder alloy on the head and face, plus time-proved induction-cooling principles, gives the new Thompson T.P.M. Valve even greater reliability in service. It's another reason why Thompson Valves are preferred by engine builders and airline operators. It's another Thompson "First" . . . the first new development in aircraft valve material in 15 years.



VALVE DIVISION

Thompson Products, Inc.

MILWAUKEE, WIS.

YOU CAN COUNT ON THOMPSON FOR ENGINEERING LEADERSHIP

FINANCIAL

Market Action of Airline Stocks

COMPANY	1945-6 ADJ. CLOSE	12/31/49 CLOSE	12/31/50 CLOSE	12/31/51 CLOSE	% CHARGE, 1950 OVER 1951
American	18	91	101	102	21.7%
Boeing	37	5	128	140	188
Capital	49	46	116	210	158
C. & N.	16	16	6	6	11.7
Colonial	45	41	78	111	56.7
Eastern	31	141	154	280	47.5
National	71	71	11	164	21.5
Norfolk	25	25	54	54	7.3
Norfolk	61	131	131	151	14.5
Pan American	79	99	112	210	-4.1
TWA	78	17	211	246	1.6
United	82	118	21	154	46.2
Western	40	0	121	154	15.6

NOTE: All figures obtained from 1945-46 prices.

Carrier Report: Steady and Rising

Airline stocks closed '51 on solid note, with equities gaining on basis of solid growth and profit prospects.

The year 1951 was good to airline investors. Equities of all domestic carriers finished the year at varying higher prices than prevailed at the start of 1951.

Despite all these peak earnings, however, not a single airline equity surpassed the high market prices established during the 1945-46 boom in air carrier securities.

This can be seen from the accompanying table which shows year-end closing prices for the last three years as well as the peak prices recorded in 1945 or 1946.

Without exception the market price at the 1951 year-end for the separate airline equities have been respectably impressive when compared with Dec. 31, 1949 closing prices.

► **Best Show**—The best showings for 1951, for normal reasons, belong to United and Eastern, with gains of 46-12% and 45-59% respectively in market appreciation for the year. The 96.7% rise in Colonial may be attributed to the speculative interest developed as a result of its proposed acquisition by National.

► **Practical-While** 1951 earnings, in a number of instances, have hit all time peaks, airline equity quotations in most cases are currently noticeably below the top market prices established in 1945 and 1946.

For example, United Air Lines sold at 63½ in 1945. For that year it closed \$2.32 a common share. In 1944 its earnings amounted to \$3.79 per common share. For 1951 United is estimated to have earned at least \$5.00 per common share, yet the equity continues a market quotation around \$5.

Similarly, Western sold at 43½ in 1945 and earned 21 cents a share that year. In 1951 earnings were estimated at \$2.50 per share but the stock market is around 15.

In a large measure the more conservative market evaluation of present and future earning power is an indication of more stability being developed by the industry. In the postwar period rampant speculation hit airline equities. Transient growth possibilities were being sold into market quotations. In effect, the false potentialities of the industry were being discounted in 30-cents measure.

Instead of the great growth in traffic and earnings, came a severe deflation in prospective and the rapidly mounting deficits of 1948, 1949, and 1950. The new almost immediately reflected in the sharp declines of market quotations which hit their low points in 1948 and recovered slightly through 1949.

► **The Turn**—A tide began to set in to hold in and increase with new equipment and tighter cost control beginning

to occur their beneficial effects. The industry started to develop some real earning power. This ground rapid momentum starting in 1949, with a net income for the domestic airlines aggregated at \$13 million, increasing to \$36.5 million for 1950, and \$48 million projected for last year.

All this has focused immediate attention in the market question of airline shares in recent years. The upsurge for 1951 airline common stock quotations range from 1.6% for TWA to 46-12% for United. (Colonial's 56.7% gain, as mentioned above, is due to a special dividend not added to any earnings representation.) Only Pan American shows a slight decline for the year, 1.1%.

Following the top gains recorded by United and Eastern, Chicago & North Western was next with 31.7%, closely followed by National with 25.3%.

It is interesting to observe that the percentage improvement at the 1951 year-end compared with 1949 closing prices are enough to reverse the hearts of the coldest investors.

For example, the equities of Capital, Chicago & Southern, Colonial, Eastern, National, Norfolk, United, and Western either almost doubled or exceeded this gain during the two-year period under study. In fact, United's common advanced more than 147% between these two measuring dates.

► **Speculation**—While many speculators are disappointed that 1951 market quotations hardly matched the more two-year-gains prices that prevailed in the lively airline market days of 1945-46, the industry still remains a much healthier as a result of the absence of speculative excesses.

Rampant speculation is much healthier for an industry that requires a steady flow of capital from an investment market.

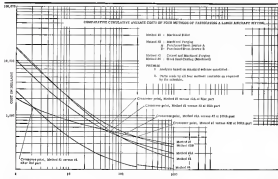
Many speculators and investors alike, both in the airline industry of 1945 and 1946 and the subsequent years, remembered their experiences only too well and compounded the difficulties of the industry desperately seeking much-needed new capital.

The decline from the 1945-46 peak to the 1948 and 1949 low points was by no means uniform. Moreover, the subsequent market recoveries that took place during 1950 followed an entirely different course for the individual airlines than prevailed in the past. Variations of market pattern were equally pronounced in 1951.

This is the best assurance that 1952 seasonal closing market prices will have an equally delicate act of surges all of their own for the individual airline equities.

—Sally Affuland

PRODUCTION ENGINEERING



UNIT COST COMPARISON, prepared by Northrop engineers, for five methods of fabricating a large fitting, indicates advantage of forging for quantity output.

Forging Advances Point Way to Savings

- More than half the weight of its rough forgings is now machined off in finishing, Northrop finds.
- So improved techniques, plus the use of larger presses, should make possible considerable cost-cutting.

Improved forging techniques and larger presses represent part of the way to substantial cost-cutting in the overall defense airplane design done on through production.

Northrop Aircraft, Inc. has its eye on the future possibilities of the forging press and has drawn upon its experience with the F-89 Scorpion to indicate the potential savings through forging advances.

► **Plenty to Chop**—At present there are 141 individual light alloy forging design components in the F-89. Counting duplicate forgings of the same design, there are 142 light alloy forgings on each airplane of the model currently in production.

Total weight of the rough forgings is 1,523 lb. In shop content, the total

weight of the finished forgings is only 760 lb.

Considering this in terms of the individual units, the average weight of the 142 rough forgings is 4.5 lb., whereas the average weight of the finished forgings is only 2.2 lb. That means that approximately 58% of the material in these rough forgings is being reduced to chips during machining.

► **Operations Required**—The light alloy forgings on the F-89 vary from quite small to moderate in size. The largest average weight 17 lb. rough and only 15.5 lb. finished. The parts require 45 machine operations and 20.5 hr. to machine time. The smallest forging weighs 0.13 lb. rough and 0.10 lb. finished. It requires 7 machine opera-

tions and 0.6 hr. to machine time.

The largest forging is 41 in. long and the smallest forging is 5 1/2 in. long (in the rough).

It is of general interest to note that, of the 142 forgings, 133 are 725 aluminum alloy, 214 are 145 stainless, and eight are inconel alloy. It is recognized, says Northrop, that forging presses are particularly essential, as compared with laminates, another as the forging of 725 and inconel alloys are concerned.

► **Savings Estimated**—Asking what this machining means in terms of production time, it is found that the average number of machine operations required per forging is approximately 12. The average machine time per forging is 4.4 hr. And the total machine time for light alloy forgings per plane amounts to 1,569 man-hours.

Possible savings in machine time through improved design and forging practices are, therefore, a most significant goal of the aircraft industry. Northrop holds it is expected that larger press capacity will make possible

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Light Alloy Forgings In F-89 Production

Number of light alloy forging
designs on F-89141
Total number of light alloy
forgings on F-89342
Total weight of rough forgings
1,171 lb.
Total weight of finished forgings
700 lb.
Average weight of rough forgings
8.2 lb.
Average weight of finished forgings
5.0 lb.
Average machine operations per
forging32
Total machine time per plane
1,100 hr.
Average machine time per forging
34.4 hr.
A savings of only 21% in machine
time through improved forging tech-
niques would mean a saving of 237
man-hours per plane.
At \$1 per man-hour, the savings would
amount to \$237 per plane.
Production of 800 planes would (at
present expense) of \$942,500 on im-
proved forging for forging manufac-
ture.

the production of forgings incorpor-
ating higher dimensional stability. Re-
duction of draft angle requirements and
wall thicknesses should also stem from
the use of such equipment. Northrup
reports.

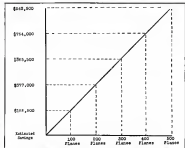
An estimate of the man-hour and
dollar savings which could be achieved
through a saving of only 21% in ma-
chine time is shown in an accompanying
chart. If the total machine time per
plane is 1,100 man-hours, a 21%
saving in machine time would mean
a saving of 237 man-hours per plane.
At \$1 per man-hour the savings would
amount to \$237 per plane. For 800
planes this would total \$942,500—
nearly \$1 million.

Methods Compared—This gives some
indication of the tremendous potential
economies which may be achieved
through anticipated advances in forging
techniques. It should again be
stressed that the possible dollar savings
indicated in the chart are based on
potential savings of only 21% in ma-
chine time through the use of im-
proved forgings. In actual practice it
is possible that the saving in machine
time might prove to be substantially
greater than 21%, Northrup believes.

For the comparative economics of
large aircraft forging designs, another
accompanying chart presents the ma-
chinery average cost of five methods of
fabrication. This analysis is based on
the all-important assumption that all
parts will be available as required by
the production schedule.



BETTER technique could cut cost of making finished part from rough forging (top).



SAVING would be high if technique were improved to eliminate 21% machining.

This scientific process, Northrup
says, can eventually become actually
through the proposed increase in forg-
ing facilities.

- The fabrication methods compared are:
• Machined billet.
• Machined forging (purchased from
two sources, A and B).
• Forged-to-size part.
• Steel and cast iron (machined).
• Compression—The chart indicates

that the conventional forging from the
cheaper vendor is less expensive than
the billet machined part during with
the flat part.

It shows that the forged-to-size de-
sign is more economical than the
machined billet at the 60th part and
that it becomes cheaper than the con-
ventional forging at the 105th part.
It is apparent that the steel and
casting is the least expensive after
fabrication of the second part; how-

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even weight and structural requirements and the difficulty of processing intricate quality castings are usually controlling in the choice of this method. The designer points to the great potentiality of the liquidation design.

Although lack of sufficient press capacity is the primary reason for buying die-casters, Nussling doesn't believe that there are also other problems leading to cause excessive machining of forgings. Among these are the use of badly worn presses, inefficient transfer of operations in producing such forgings, inadequate die design, high cost starter dies, and die wear.

NACA Money

- Research demands rise, cashlags, Hunsaker says.
- Fundamental research pays off in future design.

Government budgeting trying to keep momentum hot by checking bags sent to the military are overlooking an important point. In the opinion of Dr. Jerome G. Hunsaker, chairman of the National Advisory Committee for Aeronautics, they are not giving NACA enough money to enable it to keep pace with the service's research demands.

"The military research and development program has been increased threefold," Hunsaker says in his letter transmitting NACA's annual report to Congress. "but to date the funds and manpower authorized for NACA have not expanded to support adequately the military effort."

"Every 10 Smart, Top-The military research and development program has grown to keep step with increased requirements of new types of aircraft. But each new type brings a host of associated problems which are turned over to NACA. And NACA hasn't the funds and resources to do all this work and still dig deeply into fundamental research."

"Only by concentration on fundamental may we expect to find leads to radically new developments which should pay off in design of future aircraft," Hunsaker warns. "We do not know how long the present period of tension will last but we know what discoveries are every day made."

He is not optimistic that the fruits of research can be gathered solely for U. S. benefit. The repeated appointment of superintendents, Hunsaker says, has made possible radical gains in airplane performance that are of great military importance. He adds: "Each year we

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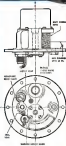
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also attainable by a "pilot survey."
● **First in Review**—The report which accompanies Dunham's letter covers the total year that ended last June 30. Due to the fact that so much of NACA's work is retained for security reasons, the report contains practically no previously unclassified information, but summarizes the technical notes issued throughout the year.

Some points stood out in the year-end report which are worth reviewing.

● **Thick wing root sections** necessary on high aspect ratio wing used not have high profile-drag coefficients. Minimum attractive lift-drag ratio may be increased appreciably with boundary layer control. (Tech Note 2405)

● **Flowing reduction in velocity** may be obtained by sawing the tail so that the trailing edge is about one chord length ahead of or behind the base of the missile body. (Tech Note 2160)

● **Roll plates on swept wings** at low lift coefficients may increase the slope of the lift curve, reduce maximum lift-drag ratio, decrease maximum lift coefficient and increase longitudinal stability. (Tech Note 2238)

● **The ideal weapon**, which is generally one of the two controlling factors in airplane performance, had no apparent effect on the flying qualities of a model representative of a proposed future military aircraft in which mass is concentrated along the fuselage. (Tech Note 2219)

● **Cruise helicopter speed** is expected to require higher tip speeds of the rotor in order to avoid loss of lift and consequent tip stalling of the rotating blades. But the higher tip speeds cause more performance loss due to compressibility. Compressibility effects may be delayed by kinetic twist. (Tech Note 2277)

Order Cancels Fisher Lathe Production

The maddled U. S. machine tool program is somewhat less than a year's production of a single machine tool, with notice to Fisher Body division of General Motors of cancellation of its previously awarded order to make 10,000 lathe machines.

Says Dan Moody, chairman of the Detroit area in a place where additional contracts should be placed to meet the rising labor surplus in slow-down auto plants, find a breakdown into National Production Administration about the cancellation.

An FPA source says that American Works that the total lathe order was approximately 750 machines and that the USAF share of this was slightly less than 400 when the requirements were assembled last October.

The arrangements that were made for Fisher to participate with Ballard were approved under an order by Civil Service Administration, acting for NPA, DPA and Department of Defense.

Says Moody that he understood the Fisher plant was "within 15 days" of being ready to start production when the cancellation was received.

Indications are that the Ballard cancellation was a result of the lowering of Air Force peak aircraft production requirements under the new peacetime schedule for production.

Another factor was reported to be the fact that a number of aircraft engine manufacturers who had signed to use Ballard machines, had decided to "make do" with other machine tools, less readily suited for this work, but more immediately available.

An FPA source says that American



'MINIATURE' THAT PRE-PROVED XPST-1

This 1/10-scale, radio-controlled, dynamically similar model served as the development centerpiece in the creation of Convair's huge Navy XPST-1, world's first helicopter flying boat. Craft, reported to be the last full-scale model to be developed from

a dynamic model, had its characteristics evaluated with this model, tested and modified over a period of years. Model was displayed at Miami Air Show, but later displayed at Chicago. The report is given to Smithsonian's National Air Museum.



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Wings that Fisher would shortly get another assignment for machine tool manufacturing to take the place of the Ballard conviction. Fisher is to be reimbursed for money invested in tooling for the Ballard project, under a CSA guarantee.

The Ballard conviction came pendently, on the heels of a blast in Congress by Sen. Danaher Mitchell's Joint Committee on Defense Production on the general machine tool situation. It cited machine tool production as the No. 1 bottleneck in the defense picture and entreated Department of Defense not to string women to substantially increase machine tool production and cut down the backlog.

First Delivery Made By Small Contractor

The M. H. Pryor Manufacturing Co. of Marietta, Ga., has delivered its first B-47 school to private B-47 school and repair contractor B. F. Goodrich. This is one of the many successful small business Air Force subcontractor stories, since Pryor is making B-47s which entirely with used machine tools drawn from the Air Force tool room at Marietta, Ga., and Omaha Company started only six months ago—July 6, 1951.

Previously, Pryor was an machine company owning a shut-down warehouse in Marietta. Pryor has 40 employees. He repaired the company in

1942 and made tooling in World War II, but shut down and sold out after the war. Goodrich helped start him up again last summer.

One of his USAF private tooling machines is "Glasco" (1) is of 1917 vintage.

Goodrich and Air Force officials attended ceremonies on Pryor's delivery of the first B-47 school to Goodrich.

Ecco Sees Big Transport Backlogs

Canadian Ltd., Montreal, is looking forward to making profitable use of its license to manufacture the Douglas DC-4, DC-6A and DC-6B for Canada and the British Isles after the present emergency. This is indicated by its parent company, Electric Boat Co., in its annual report.

Ecco notes the steadily rising Canadian air traffic from 1949/50 passenger service in 1947 to 1,231,000 in 1950—and says that in light of civil aviation production "being stalled" for the time being, there will be a sizable backlog built up for transport. Ecco apparently intends to benefit from this situation at the present time.

Canadian built 71 Douglas North Star and Canadian Force (DC-4/DC-6) with Roll-Rover Motors. Presently the company is building, or will build, under license, North American F-86 Sabres, Beech T-36A advanced trainer, Fairchild and Lockheed T-33 trainers.



A BONE WING SKIN IN 38 SECONDS

Covair has installed a new punch-type bending roller in the F-100 plant which will shape a B-47 wing skin in 25 seconds. Acquisition of the roller will make it unnecessary for Covair to ship the wing skin to Houston, where a similar tool was used for processing. Eliminated, too, will be the danger of damage or corrosion to the sheet, normally involved in the shipping and handling process. Overall length of the

machine is 50 ft.; three 10-in. rollers are mounted near floor level for easy loading of sheet. Chance wasn't supposed to get the machine from the British, British and Co., Cambridge City, Ind., with this spring. But Ford Motor Co. was to get one last fall which it couldn't use until spring. Ford, therefore, traded its delivery promise to Covair to a gesture of industry cooperation.

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More Briefs From IAS Sessions

These digits enhance AVIATION WEEK's presentation of subjects discussed at the 25th Annual Meeting of the Institute of the Aeronautical Sciences in New York, Jan. 28 Feb. 1. Other sessions appeared last week.

Aerodynamics

► The Effect of Non-Uniform Surface Temperature on the Transient Aerodynamic Heating of Thin-Walled Bodies. A. E. Brown and R. H. Edwards, Research Physics, Missile Administration department, Hughes Aircraft Co.

A new study analysis is given of the transient thermal conduction problem of heat in a thin metallic plate, whose the boundary here is known, being used to record the effect of the non-uniform surface temperature distribution on the rate of heat transfer. Lightbulb's approximate theory of heat transfer in a non-uniform surface is used and leads to the formulation of the problem in terms of a partial integro-differential equation solved in closed form.

The results are compared with previous analyses in which the differential heat transfer coefficient for an uniform surface is used, and it is shown that the latter approximation leads to errors in early good agreement with the more exact solution.

However, if heat transfer coefficients are calculated from the more exact solution they differ greatly from the ones predicted by isothermal surface theory.

This indicates that caution should be exercised in interpreting experimental data obtained by the transient method with a non-uniform surface.

► The Effects on Dynamic Lateral Stability and Controllability of a Large Artificial Vortex in the Tailplane. Dr. Robert O. Schade, Oliver R. Glick, Jr., and James L. Russell, Jr., Langley Aeronautical Laboratory, NACA.

This paper includes the results of a combined theoretical and experimental investigation to determine the effects on dynamic lateral stability and controllability of large artificial vortices in the rotary stability derivatives.

The theoretical work includes studies of the effects of large changes in the loss in very lateral stability derivatives, both directly and in combination and of the product of the inertia quantities.

The experimental portion of the investigation included tests of a computer model in the Langley free-flight tunnel to determine the effects on the flying characteristics of varying the derivatives both independently and in combination.

In addition to providing experimental data on dynamic lateral stability for comparison with theory, the flight tests provided an indication of the effect of the derivatives on controllability and present flight behavior.

► On Wake Interaction of Strong Shock and Mach Waves Generated Downstream of the Shock. Jay-Tai Chi, Graduate Student, Department of Aeronautics, John Hopkins University.

Analytical solution was obtained for the flow behind an oblique shock produced by a wedge when the flow is perturbed slightly from the straight line configuration. The solution is used to study the interaction of shock wave and Mach waves generated downstream of the shock.

It is found that Mach waves are reflected from shock wave without change of sign but with different magnitude. The "reflection ratio" approaches zero as the shock wave degenerates into a Mach wave and increases monotonically as the shock strength is a measure of deflection less than unity.

The interaction of shock wave and Mach waves generated by a small perturbation on a strong surface produces an almost singular singularity on the shock wave with the large shock and transverse shock stretched in space and time. The shock wave also behaves like a piston driving structure which deforms under a simple stress-strain relation. The solution is applied to calculate the pressure distribution on a supersonic airfoil at large angle of attack.

► Definite Influence of Size for Severe Wind Turbulence at Variable Test Chamber Pressure. Ronald Housman, Professor, Department of Aeronautical Engineering, University of Minnesota.

The flow process occurring in the dilution of a supersonic flow, based with this jet and its influence has been previously investigated by the author (NACA Tech. Report No. 6774) for the special case where the pressure in the test chamber surrounding the jet is equal to the pressure in the test case section of the level nozzle.

The present analysis deals with the general case, where the test chamber pressure is different from the nozzle exit and pressure. An exact solution for non-dimensional velocity, density, and temperature is obtained.

Definite influence and other flow parameters are exhibited for variable chamber pressure in a Mach number range from one to five. The conclusions of test chamber pressure control by means of the admissible deflection ratios is shown. The stability of the chamber pressure is proved and a quantitative description of a "flow steering" process of the nozzle is given.

Aeroelasticity

► An Analysis of the Effect of a Power-Boost System on Wing-Torsion Control. Reuben F. Flatt, Robert H. Barnes, Aerocontrol Research, Inc., Ames Aeronautical Laboratory, NACA.

The results of a brief analysis to investigate the effect of a power boost system on the behavior of a control system are presented. Since torsion is essentially a condition of energy balance and a boost system is a source of energy the question arises as to the conditions under which the boost system can affect the energy balance.

A representative case problem is discussed in which a aerodynamic system of the wing-torsion was considered. A power boost was introduced which caused a significant change in the power boost in proper

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less to the deflection of the third section. The results were obtained by simultaneous solution of the equilibrium equations on an analog computer.

The results indicate that the concept of structural feedback control by ground loads making further analysis of existing structures requiring a power-lifted system.

► The Calculation of Spanwise Loadings for Offloading Aircraft in "Lifting Line" Techniques. M. A. Dinger, Research Engineer, and Martin Goland, Associate Director for Engineering, Malvern Research Institute.

The spanwise loading of an aircraft, rectangular winged, oscillating wing is studied on the basis of two lower spanwise sections, and on the basis of a short extension of the Weinger "lifting line" model to the oscillating airfoil case. The elements of each procedure are carefully outlined to show light on the physical significance involved. Calculations by the various methods for a wing of aspect ratio 5, oscillating with reduced frequency 1 in six different spanwise structural modes of motion, are then reported, and analyzed.

As a consequence of this work, a new "lifting line" model is obtained which should provide relatively accurate results in the study of the pressure lift distribution of oscillating swept wings.

The accuracy of the results obtained by use of the new model should be comparable with that obtained with the Weinger method, for the two bending shapes where the former is reduced to the steady-state case. No direct studies of swept wings are included in the paper. Thinkings of an extension of the Götting F function will be reported below that can be accomplished.

Motorless Flight

(Joint Seminar in Cooperation with
The Society of Engineers, Inc.)

► Boundary Layer Studies on a Subsonic, Airplane, Engineering Research Staff, Mississippi State College.

Considerable effort has been expended in improving the quality of the flow in low turbulence wind tunnels. The goal sought is improving low turbulence tunnels to equal the purity of the flow around an aerodynamic body as flight through the atmosphere. However, it is only actually the influence of noise as a disturbance to the laminar flow has begun to be seriously considered.

It is in these two aspects that the full boundary layer contribution is a tool for studying flow studies. The flow studies can be made in a low noise level and in an extremely sophisticated low disturbance. Two of the principal trends of transition are then removed. Visualization of the aerodynamic surface can be kept low by suitable structure and the disturbance due to surface corrugation can likewise be minimized.

When a conventional wind tunnel flow is investigated on a surface, the transition on the upper surface was found to be at 44% of the chord from the leading edge. The conventional result was becoming a boundary surface.

In addition to showing the results on the conventional surface, a study of porous surface on the same airfoil is described. By

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cause of air action through holes packed in the fabric it was possible to alter the former boundary layer at 94% of the chord.

As a conclusion the author shows that it is not difficult to obtain a very good approximation in which to study viscous developments on a surface. His results on the conventional wing and on porous sections bear out this conclusion.

► On the Possibility of Soaring as Traveling Wings in the Jet Stream. Jacques P. Roussier, Air Force Cambridge Research Centre, Geophysics Research Division.

Synoptic flights and meteorological observations indicate the existence of traveling waves in the jet stream with a period of 20 to 30 min and a wave length of more than 25 km.

The theory shows that the wing profile of the jet stream provides a duct between approximately 33,000 and 40,000 ft, in which gravitational waves are trapped and can travel downstream with a velocity smaller than that of the jet stream. If the amplitude of the wave are large enough the jet stream presents a new means of energy for airplanes. By which planes can travel over great distances with high speed.

Structures

► Corp. Building of Columns. Chas. E. Lofgren, Ames Research Center, Santa Monica, California. Research Scientist, Ames Research Center, National Advisory Committee for Aeronautics.

The creep of a slightly cracked elastic column carrying a constant load is studied theoretically. The nature of the column is characterized by a non-linear relationship, under constant uniaxial stress, at a time that was selected because it applies to at least two materials—7075-T6 aluminum alloy at 500° and a low-alloy steel at a temperature of 500°.

However, the analysis is extended to any material having creep properties of the same form and for which the material constants are known. A stress-time relationship under constant material stress is formulated from the constant stress hypothesis with the aid of Steady's engineering hypothesis of creep.

The analysis leads to the conclusion that the lateral deflection approaches infinity as time tends to the column collapse-infinite time.

Results are plotted showing the maximum length of time the column can support a given load before it collapses and also shows the growth of deflection prior to collapse.

The results show the dependence of maximum lifetime on initial conditions and on the dimensions of the applied load to the Euler beam.

► Analysis of Stiffened Canted Panels. Charles Shain and Clarence H. H. McCall, Group Engineer, Structural Methods and Dynamics, and A. F. Ewald, Structures Engineer, Lockheed Aircraft Corp.

A method of analysis is presented which predicts the failure of the largest-diameter stiffened curved panels or cylinders when the structure is subjected to static (uniform) or combined shear (uniform)

and compressive. Simplified formulas are given for the initial buckling stress in shear of thin-walled cylinders and curved panels. Curves are also given for the ultimate shear strength of the sheet in the buckled condition.

The method for predicting failure of the longitudinal stiffeners in a shear and curved panel is not based upon an exact mathematical theory, however, an expression

has been derived which gives the compression load for which the stiffener must be designed to withstand the effects of the diagonal tension field in the buckled curved sheet.

This method has been applied to a great many test specimens tested in shear and combined shear and compression and there is very close agreement between predicted strength and actual failure.



Cessna 170-B personal plane gets slower speed for short-field landings with...



Slotted flaps developed for L-19. Flap area is 12% of the total wing area.

Slotted Flaps Slow Cessna 170

Cessna's 170-B personal airplane now sports a slower flap which Cessna engineers say lowers the air speed needed by 10% and prevents stalling and speed approaches to be executed for short-field landings.

The flap was developed by the firm originally for its military helicopter-converted L-19 Bird Dog. That installation was such a success that Cessna decided to use the same flap on the 170-B.

Other new features include redesigned control system and elevator and additional soundproofing. Powered by a 160-hp Continental, the 1972 model cruises at over 118 mph, can carry more than 125 lb of luggage and has a range of over 500 mi. No increase in

price over previous models will be made, says the Wichita firm.

► Classic Design—Actually the Cessna flap is one of a series developed originally at the NACA and designated as the NACA 25 slotted flap. Total area of the flap is 21.2 sq ft, which is about 12% of the total wing area of 170 sq ft.

Flap operation is manual from the cockpit, four positions—0, 20, 30 and 45 deg—are available to the pilot.

The new flap does not increase the rate of climb for takeoff, but does steepen the flight path in a climb. For short-field operation, a 20-deg flap position is recommended. The plane gets off the ground at about 45 mph with this flap angle.



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But La Touche believes an improved version of the device can be adapted if the airlines want it.

* Principles of stuffing small internal engines are well known, but additional research and development is needed to produce satisfactory stuffing for larger engines.



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DC-3 MUFFLER enables no weight penalty, replacing noise of exhaust pipe.

short to the efficiency of the device as a noise damping medium.

Mufflers in the C-45 and DC-3 are essentially the same.

As a result of service test experience with the early DC-3 prototype, new mufflers are made of heavier 18 gage stainless steel, replacing 26 gage, to set heat better. The present DC-3 g involves practically no weight increase, since it replaces the exhaust pipe that formerly attached to the engine collector ring.

Formerly the pipe was retained and the muffler attached to its aft end. While this saved additional weight and protected the muffler considerably behind the engine, the Tullipipe lets it provide better sound damping.

Muffler Details—The present muffler consists of a series of tubes within tubes perforated and lined with steel wool to trap sound waves. A "bell" partially obstructing the outlet helps bounce sound waves back into the tubes. The outlet is venturi-shaped at the exhaust end to speed creation of gases, thus keeping back-pressure down.

A "mell" of hot air, introduced to prevent after-firing, is introduced into the device by a special scoop. Mufflers measure 18 in. d. by 4 ft. at a maximum by the tube-with-in-tube arrangement.

The Demonstration—In the following demonstration, the two C-45s, powered by 1,200-hp. Pratt & Whitney R-2600s, flew overhead at 6,000 cruise power, each engine developing about 2,200 hp at 2,200 rpm and 35 in. Hg manifold pressure.

GAA agents were shared both plans to assemble that spending conditions were equal. Sound track recordings were taken both outside on the field and indoors in airport buildings nearby by Professional Gae and Camera Equipment Co.

On sound track recordings taken in down, the difference is noted between the two planes was greater than that heard outside. This was borne out later by double meter readings. At least part of the disproportionate reduction in noise could be attributed to the fact that the muffled plane flew slightly off course over the apartment building where the sound recorder was located. But aside from this, there was evidence the muffler tended to damp

out the lower frequency range of sound waves, those "that penetrate the walls of buildings most easily," as New York Testing Lab described them.

Sound Unit—Most startling difference in noise, heard after the demonstration, was noted in the engine bay by the following: was that between a muffled and unmuffled Howard aircraft which had been demonstrated in comparison earlier at Tuskegee. The muffler, similar than that on the C-45, opened the single BMW 450-hp. Wasp 3 engine used in the plane, to an extent that would indicate considerable potential by the use of an acoustic aircraft. The Tullipipe says it has given more than 500 hr. trouble-free service so far.

Flipping Prop—The Tullipipe is also developing an anti-ice prop—"anti-icing" prop, he calls it—to go with his muffler. Blades on this prop flip. As a bird's wing. They can swing back and forth from upright 90 deg. position to about 60 deg. forward.

The Tullipipe has already tested this anti-ice prop on his 450-hp. Howard. He hopes to build one for larger planes.

Among the distinguishing features of the anti-icing prop:

- Forward swinging blades to reduce ice-berms. When plane is braked prior to landing roll, blades are forced forward like brims of an automobile umbrella.
- Pitch controlled by blade swing. Feet and aft moving center blades to turn, changing the pitch.
- Slotted step on leading edge of wing acts as "ice detector" as blade does not vibrate in flat, thus warning what the Tullipipe calls "icing noise."

Representatives—Among visitors to airport at the demonstration were American, Trans World, Capital, BOAC and KLM. Representatives of Air Transport Assn., Wright Aeronautical division of Curtiss-Wright Corp., and Sikorsky Aircraft division of United Aircraft Corp. also attended.

While the anti-icing prop of the new muffler were not impossible to spot shimmers, a number stated it was decidedly a step in the right direction. And they noted that it took a Brooklyn manufacturer little known to aviation leaders, Aero Steel, and a small contract carrier, Motor Air Transport, to take the first tentative steps to eliminate noise in operation of large transport.

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LOUNGE, set off from cabin by Plexiglas panels, is Cal Central Martinair feature.

Cal Central Likes Its 2-0-2 Fleet

Airline reports Martin coaches popular with pilots, passengers; plans hourly L.A.-S.F. service.

By George L. Christensen

Redhead. CALIF.—Incorporation of the Martin 2-0-2 into California Central Airlines' high density coach traffic system has produced startling results for the carrier.

Number of passengers carried in 1951 soared 55% over the 1950 figure, and passenger miles jumped 41%.

Average load factor for last year was 63%, and on the popular Los Angeles-Burbank-San Francisco-Dulles route the figure peaked over 88%.

The first between these two points on Cal Central is \$11.70. Reduced coach costs \$11.84. This compares with CCA's \$12.00, and the popular Los Angeles-Burbank-San Francisco-Dulles route the figure peaked over 88%.

The new fleet-line service at popular prices and the flying public went for it in a big way.

A month after the planes were put into service (October 1951) the airline carried 14,025 passengers. Two months later, the monthly total was 16,707 passengers. In one day, four Martinairs, with limited seats from one DC-3, loaded 1,374 people.

The Martinair is proving so popular with the carrier's flying public, C. L. Stott, the airline's chief pilot, told *American Worker*. On a test hop, he showed the reporter a perfectly stable descent made with gas down, flaps in full-down position. Rate of descent was 1,300 fpm, but adjusted hold at a constant 155 indicated. From a flight approach, maintenance and line service

ing standpoint, the airplane stands up smoothly with comparable equipment, a company spokesman said. Cal Central, after only four months of operation, averages over an hour on weekdays and less on hours over weekends and holidays. To date CCA has not encountered a single case of engine failure on the plane's Pratt & Whitney R-2800s.

Passenger—CCA did not lose any time reworking new features to lighten the appeal of its new, high-speed Martinair fleet.

Major innovation was installing an engine-powered "Air Lounge" in the forward part of the cabin. The compartment is in addition to the existing 16 seats, raising total capacity of the plane to 41.

The lounge is partitioned off by edge-lighted, transparent Plexiglas panels. Reasonable tables may be set up between the two pairs of lounge seats. Currently, the airline serves complimentary snacks, coffee, coffee, chewing gum and cigarettes.

The integral tail passenger loading ramp, which opens automatically and automatically, and the engine baggage racks that reduce waiting for baggage at destinations are proving popular with passengers. So is Cal Central's excellent record for on-time performance.

Engine—One of the ideas CCA has up its sleeve to make the service still more attractive to its passengers.

Phone-to-ground telephone. The airline is seriously considering such an installation for passengers who might have urgent need to communicate with office or home.

Cocktail service. Having an engine-



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Image, excited because would be a success. And being an immediate answer, Cal Control would have only one set of state regulations to abide by.

• **Heady service.** Company officials said that in the not too distant future they hope to run flights between Los Angeles and San Francisco every hour on the hour—except, possibly, in the middle of the night.

• **Route extension.** The carrier some time ago applied to Civil Aeronautics Board for permission to inaugurate service to the "gold coast" of Las Vegas and Reno. Although still not approved, Col Sherran says "it will come."

• **Young Line-Cal Control** is a young airline-in-birth flight took to the air on Jan. 2, 1949. And it is probably the only "husband & wife" scheduled airline in the business. Sherran is founder and president. His wife, Edna is secretary-treasurer. She watches the delta very closely, since passenger fares are the sole source of CCA revenue. In addition to the \$11.79 Los Angeles-San Francisco fare, the carrier charges \$5.35, Los Angeles-San Diego (CCA's Martinis can't seem drive the cost to \$1.00).

Another convenient Cal Control service is the shuttle route between Los Angeles International Airport and Lockheed Air Terminal, Burbank. Most northbound flights from San Diego and south-bound flights from San Francisco land at both fields. Scheduled flight time is 15 min. and fare is \$1.95. On the road, the trip can take 1-1.5 hr., by car it costs about \$7.50.

A long-range commuter service has just been inaugurated by Cal Control. "Sunrise" flights now take off from Los Angeles morning to San Francisco every morning except Sunday at 8:00 a.m., arriving at destination at 9:35. Return flight departs at 4:00 p.m. and lands at 5:35, allowing passengers to spend a full working day in the bay area.

A version of the "family plan" recently put into effect by the airline allows children over two and under 12 years of age to travel at half fare on Tuesdays, Wednesdays and Thursdays. • **Flights-Cal Control** officials proudly point to their "first" claimed by their airline.

• **First** to inaugurate coach-fare service between L.A.-S.F.

• **First** to supply regular commercial airline service to Edwards AFB (Muroc) and Inyokern, Naval Air Test Center. Two roundtrip flights operate daily to these military establishments.

California Control, which calls itself a scheduled, subsurface airline, looks to the future with confidence. It feels its fleet of modern, high-speed aircraft will help it beat its 1942 record year, when it flew 145,165 passengers and 267,325 passenger miles.



Messenger of Mercy—Caring doctors and nurses, a lone Sikorsky HO4S helicopter of the Air Rescue Service is credited with checking a yellow fever epidemic which was threatening to sweep Costa Rica last fall.

Operating from a makeshift base in the northern part of this Central American republic, the helicopter covered 4,000 square miles of remote territory in a 13-day period in good weather and bad.

During 42 landings, many of them in small tropical

clearings, doctors were able to inoculate 975 natives—and though 31 had perished before the helicopter flew in with medical aid, not a single death from the fever was recorded after its arrival.

Other posttime missions performed in recent months by Sikorsky helicopters include the evacuation of 140 flood victims in Argentina . . . flood air-drops in the Kansas City flood region . . . and help for flood-stricken inhabitants of the Po River Valley in Italy.

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NEW AVIATION PRODUCTS



USAF Plane Seat

A new pilot's seat for military aircraft, being considered for use in the Fairchild C-119 Packet and Chase C-125 Avenger, has been announced by Aeroflex Corp.

The seat is built to USAF Spec 25183 and, according to the firm, has been successfully tested to support a back and side load of 1500 lb. and a down load of 4900 lb. when it is fully reclined and in the highest vertical position. The seat is adjustable 5 in. vertically and can be moved 6 in. fore and aft on tracks. To recline fully, back swings to a 75° ang. position, from a normal of 125 deg. The seat is stressed for a harness load of 2500 lb. plus an 1800-lb. belt load.

Magnesium, steel and aluminum alloy are used to make up "an extremely flexible" seat frame, says Aeroflex. Cushions are rubber-padded, canvas-covered. "Flash-off" type seat cushions is detachable with a survival kit. The mainframe weighs 50 lb. completely equipped.

Aeroflex Corp., Boston, Conn.



Roller Pump

"Magna-Matic," a new type of positive displacement pump for handling

greases, hydraulic fluid, lubricating oils and similar products, has been developed by Milleritec Hydropower, Inc.

The pump is similar to vane-type units, with an independent eccentric. Refill are used in place of vanes. This change increases pump life three to four times, the company says. The refills contact the outer case as in a vane bearing, and sealing friction replaces sliding friction present in vane pumps.

The pump is available in three sizes: types constant displacement, adjustable displacement, variable and reversible displacement. With the latter, flow can be stopped or reversed instantaneously or alternately with the pump still continuing to operate in one direction. All pump models operate in either direction of rotation.

They have a speed range from 300 to 1600 rpm and a capacity of less than 1 to 14 gpm. The units measure 2 1/2 in. diameter and 6 in. length, and are built to close tolerances, according to the maker.



Rivet Soves Problem

A tough new bilged rivet, for high strength application in aircraft, is being produced by the Deutsch Co.

The rivet originally was conceived by North American Aviation, Inc., to help engineers and production men in their way through some tough assembly problems.

Approved for limited application of the rivet in Air Force planes has been obtained, says the firm. Its use is confined to assemblies where conventional high-strength fasteners ordinarily would be used, but cannot because of the unsuitability or blind nature of the installation.

Some advantages listed for the fast, called the Bilged Bilged Rivet are: light weight combined with high strength; capacity to be driven into blind holes in forgings or fittings; maximum side

clearance needed for the rivet on the blind side of the work.

Available in countersunk or pointed-head types, the rivet consists of two parts, a 1/16-in. steel pin and a stainless steel or aluminum alloy sleeve. It has satisfactorily passed corrosion and fatigue tests, says the firm, and is supplied in diameters of 3/16, 1/8 and 1/4 in. and in lengths up to about 2 in.

The Deutsch Co., 7000 Aviation Blvd., Los Angeles 3, Calif.



Flexible Metal Hose

A new flexible metal hose, developed primarily to carry gases in liquids under high-temperature conditions, is being produced by Teflex, Inc.

Made of bronze, the hose is resistant and is used to have resistance to corrosion and abrasion, and to be an ideal vibration eliminator.

The product, called "Uniflex," is of helical construction and distillation. Being built between the inner and outer convolutions, permitting greater flexibility and longer life, Teflex explains. When additional protection is desired, the hose is produced with a covering of one or more layers of flexible bronze wire braid.

Teflex, Inc., 500 Philadelphia Ave., Newark 5, N. J.

ALSO ON THE MARKET

"Ten-N," for sealing windshields and other areas on aircraft, is said to withstand extremes of weather, stress, unaffected by vibration and temperature change and adhere to practically any dry surface, including rubber, metal, glass and wood. Elvaco Co., St. Paul, Minn.

"V8 225" fast-drying black primer for military plane instruments and other equipment, instantly protects protective surface coating even in polished chrome, according to maker. The vinyl-based undercoating meets self-curing, humidity, abrasion and solvents, adheres in 15 min. United Lacquer Mfg. Corp., 1000 W. Elizabeth Ave., Linden, N. J.



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AIR TRANSPORT

Newest Merger to Link Northwest, Capital

- Combined company would have 26,000-mi. system; early approval by stockholders, CAB predicted.
- Proposed consolidation is largest in current group of airline merger plans being evaluated by CAB.

Latest and largest airline merger in the new series that promises to re-make much of the U. S. airline route and ownership structure is the proposed Northwest-Capital Airlines union. Officials expect prompt stockholder approval will be followed by Civil Aeronautics Board's blessing within the year.

Northwest President Carl Hanley is slated to be board chairman and Capital President J. H. Connors to be president of the new joint 26,000-mi. international airline. Corporate name is Northwest-Capital Airlines.

Capital and Northwest stockholders will exchange their old ownership shares for common stock certificates of the new airline in a one-for-one basis. Closing price was about identical on the New York Stock Exchange a few hours before signing of the merger contract the evening of Jan. 31. Prices then were Capital 161 and Northwest 161 a one stock share.

• **Prefixed Stock**—Northwest's 364,347 shares of 4 1/2% convertible preferred stock will be assumed as an obligation of the merged company. Capital has no preferred stock outstanding.

Applications for approval filed with the CAB asked for expedited consideration and approval in view of the "incalculable potentialities of the proposed merger in serving the public in prompt and economical delivery."

Active Northwest-Capital merger negotiations dated as Jan. 20 and were reduced to completion in only ten days, following a year-long lull. The two lines almost closed a similar deal over a year ago.

Northwest-Capital may become the nation's third largest airline, stretching from the East and Gulf Coasts all the way westward through Seattle-Portland-Moscow and the Alaskan to Korea and Japan—plus a spur route to Hawaii from Seattle-Portland. The union is also to be a favorable medium to cooperate with the North Pacific flight to Europe, although it has no such certificate now.

• **Plutonic** Structure—The merger also expected to strengthen the financial picture for both lines. At present the

two airlines are competing between Minneapolis and East Coast, and they are both beset by route restrictions imposed by CAB in protest each from the other all along the way. Mergers would improve these present situations.

Merger Plans

Here is a brief outline of the transactions covered by pending airline merger proposals:

• **Northwest-Capital**. From East and Gulf Coast to the Midwest to Seattle-Portland, thence to Alaska, the Aleutians, Tokyo and Korea, plus a spur from Seattle and Portland to Elmer.

• **Bozell Mid-Continent**. East to a north-south route covering the central U. S. from Chicago, Denver and other north central cities to New Orleans, Houston and other Texas cities, then on south to Mexico City, Havana, Bogota and South America.

• **National-Colonial**. Northwest routes in eastern U. S. from Montreal westward to New York to Miami and the Gulf Coasts, plus a spur route to Bermuda from New York and Washington.

• **Delta-Northern**. These two widely separated airlines with Northeast strong New England and New York City, while Delta operates eastward from Miami and Atlanta through the Deep South to Texas cities. Merger is envisaged as operation of a linking route from the Deep South to New York, since CAB opposes big route shut-up like this, observes one CAB negotiator on acquisition by Capital of a southern route or a further merger looking with a north-south route like National.

• **West Coast Empire**. These are local service airlines serving the states of Washington, Oregon and Idaho.

in several important traffic markets, including Minneapolis-St. Paul, Milwaukee, Detroit, Cleveland, Chicago, Pittsburgh, New York and Washington.

Pending of these unions should also make for better equipment and personnel utilization in the new lines, and a better new plane-buying program later on.

The two lines now operate a total of 47 Douglas DC-4s, 10 Boeing Stratocruisers, four Lockheed Constellations, 18 Douglas DC-3s and three Super DC-3s. Capital will have 12 Constellations by 1954.

• **First Merger Pending**—The entire U. S. scheduled airline route pattern is changing. Eight trunk lines and two locals have signed merger agreements and more are expected this year.

CAB is expected to approve three of the key joint mergers plus three of the local service unions. Mergers up for CAB approval are Northwest-Capital, Bozell Mid-Continent, National-Colonial, Delta-Northern and West Coast Empire. Only Delta-Northern is expected to meet CAB opposition.

This merger union leaves only three smaller trunk lines without firm merger plans: Chicago and Southern, Goshawk and Western.

The Mid-Continent agreement with Bozell last month appears to satisfy Continental. CAB previously had ordered Mid-Continent and Continental to slow down any plan they shouldn't merge. But Mid-Continent had been giving up its Continental route and moved to Bozell control.

• **Main Merger Contingent**—CAB expects back to several acceptable plans for the smaller lines that do not have positive support in the works now. The high CAB officials have mentioned the following possibilities: Continental could merge with either the new Bozell Mid-Continent group or with Chicago and Southern or Western or one of the big four—American, Eastern, TWA or United. Chicago and Southern possibilities could be CAB include merger with Continental, Delta or Capital.

CAB hasn't tried yet to figure details, merger prospects for Western, which is doing pretty well on its own right now. Some officials believe Western should merge sooner or later, but even so, in instance for which line also shared. But the situation in Western's trunk routes suggests a complex subject from a CAB standpoint.

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► **Kobusson Airlines** has appointed 1 captain & Co. Ops. N.Y., as its air-crafting agency.

► **Seaboard & Western Airlines** reports a fleet of 26,575,493 in the country and military air flights over the Atlantic and Pacific in 1958—almost three times a year ago. Seaboard says an significant shift in the Atlantic to U.S. supports extending reports by TSC. Seaboard's cardboard Airlines say flight mail to several outboard (U.S. support) traffic.

► **Southern Airlines** carried 96,572 passengers in 1958, up 215% over 1956.

► **State Department** has ordered payment to 51 between companies to air routes. State says expenses of 50 a the plus regular salaries during period travel—each adds up to disaster travel for, and thus lost on the Department's expense accounts.

► **Trans-Canada Air Lines** has lowered fares 7% on trans-Canada flights to U.S. and added because the Canadian dollar has lost its parity with the U.S. dollar.

► **TPA Alaska Airlines** has signed a carrier contract with subsidiaries, then falling to the ALC. Midland United Contract go is there a 6% pay increase.

► **Trans World Airlines** reports domestic TWA traffic up 25% the first half of January. Office at 20 airlines 500-5 increased here in January and Paris. Alaska says as 1958 airline pay needed a potential of air before modern and under lines.

► **United Air Lines** reports flying 64 million miles on the Pacific route in 18 months since the Korean war started U.S. This month will schedule 30% more daily air miles than it had a year ago on commercial routes. Operator 75% of the daily air miles with DC-6. ► Exports delivery of 45 fast Corvair Line 340 in March. The 40 in order cost \$23,117,000.

► **Wiggins Airways**, in its certificate of aerial licensing before Civil Engineer Vernon Rothberg, report that before to "new world" using the death-bell of airline service for all but the biggest New England cities. Wiggins and Northeast will serve the big cities and "the end history of local passenger service" shows what happens when a carrier is "doing a job relatively and for the sake of good-time."

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Magnificent

Mrs. Robert P. Patterson lost her dearest husband in the tragic crash of a transport plane at Elizabeth, N. J., on Jan. 22. The nation mourned Judge Patterson, who had served his country well, including the response before the Secretary of War. Thirty persons died in that accident—all 23 occupants of the C-47, including Mr. Patterson, and seven persons who were in their homes.

Emotions of indignation arose in the Elizabeth area, which had gone through two air transport crashes within its congested city limits in five weeks.

Mrs. Patterson learned that these emotions had reached such a peak that headline accusations were being circulated about the pilot of the day, which had

increasing pride in her husband. She needs all her confidence to comfort her daughter, Ruth, who will be four on Aug. 14, and her daughter, Robin, who will be two on July 23, and the baby which is due the end of July.

She has the responsibility for these dear children who have been robbed of a loving and steadfast father, and she needs your help to pick up her family life threads and supply.

Assistant's letters in a simple way with horses and horses, and their families. Mrs. Patterson's deed will take its place with the greatest of them.

Aviation salutes a magnificent woman.

To Censor or Not?

The 60-day experimental period of voluntary censorship American Wires begins Dec. 10 on the subject of the Air Force's secret telecommunications. The subject has been.

As the deadline for this year passed, the editor had not completed a series of talks with various government officials in Washington on the subject of the experiment, and whether they believed it was worth continuing.

We feared, on one assessment, that there was been reluctance on the part of officials to talk about the subject on the record, and up to deadline as one in the government, even those who had been most critical of the press for "revealing secrets," had been found who stepped in to continue this experiment. This was a baffling experience, to a staff that has heard so much criticism for what it has published.

Until we can complete our survey, therefore, we are maintaining our own strict voluntary censorship on material concerning this secret matter: that Air Force Secretary Feltman officially requested the press to consider as a classified object in an appeal about Dec. 1.

In the meantime, Life Magazine appeared last week with a two-page color spread, including a drawing of the big bomber. The picture had been cleared with security sources, so we were told last week in Washington, but the caption material was not cleared.

What Goes On At CAA?

Civil Aeronautics Administration put into effect last week "changes in the organization of aviation safety." CAA people have been downgraded, upgraded, and transferred all over CAA's unit network.

In our opinion, this new setup is not in the best interests of aviation, CAA itself, the Commerce Dept., or the public, and we cannot give it a vote of confidence. We do not have faith in the integrity, technical or other abilities of some of the individuals who are high in the revised aviation safety setup. We do not like the organizational setup for various reasons which we shall probably make known. We welcome comments from our readers on this vital subject.

—Robert H. Wood



Mrs. Patterson

Mr. Reid

gone out of control and crashed within a few seconds. It is understood that Mrs. Patterson asked the National Broadcasting Co. for permission to broadcast an appeal to the public for fairness.

This message was broadcast and broadcast Jan. 21 from WNBC. This was her message:

"Below I make an appeal to you I would like to thank everyone, including the wonderful families of the victims of the crash, for the outpouring of feeling which has given us courage.

I appeal to you with all my heart to use this rare, heartless flood of sympathy and strength to give moral support to the widow of Capt. Thomas John Reid. He was the courageous and competent pilot of the plane that crashed at Elizabeth on Jan. 22, killing everybody aboard and some who lived near the scene of the accident. Their home is 611 South Broad St., Elizabeth, N. J.

"Besides her other troubles, Mrs. Reid has had to hear wickedly foolish rumors blaming her husband for the accident, and she is now in the hospital. It seems impossible that anyone could be so ingenuous and unkind.

"The favorite toast of the people who fly is 'happy landing.' We must face the fact that the landing is in God's hands. The power of your good wishes will give her back her serene courage and fill her with



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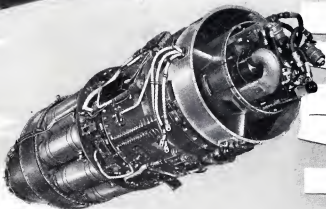
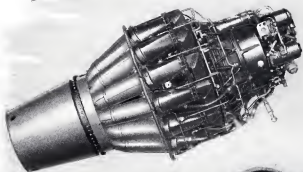
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TURKEY

Allison again fills a critical need

ONCE again, our Armed Services depend on Allison for jet engines to fill a critical need. Just as Allison engines were standing by for immediate duty in Korea, Allison-powered aircraft were the *first* to be sent abroad to re-arm the air forces of many European countries.

Our Armed Services have flown more hours in the air with Allison engines—more than 1,300,000—than with all other jet engines combined. It is natural then that they should draw on Allison-powered Lockheed T-33 trainers and Republic F-84 Thunderjets when

a new need developed for engines which are available *now*.

Today, Allison engines are depended upon for a major role in the military planning for the air defense of our country as well as powering trainers and fighters for the air power of nations which are our allies in a mutual pact against aggression.

Allison

DIVISION OF GENERAL MOTORS, INDIANAPOLIS, INDIANA

